

**Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
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Petition for Waiver to Allow Deployment of)	GN Docket No. 18-357
Intelligent Transportation System Cellular)	
Vehicle to Everything (C-V2X) Technology)	
)	

**COMMENTS OF
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I. INTRODUCTION AND SUMMARY

The Petition filed with the Commission by the 5G Automotive Association (5GAA) requests a significant reallocation of channels within the 5.9 GHz band to benefit Cellular Vehicle-to-Everything technology (C-V2X). The reallocation proposed in the Waiver Request would have a significant impact on existing and planned deployments of Dedicated Short Range Communications (DSRC) under the Commission's existing 5.9 GHz licensing and channelization rules. As a result, the request is inappropriate for a waiver and should only be considered as part of a formal rulemaking proceeding. Alternatively, since C-V2X is not a mature technology and is still under development, the 5GAA should consider seeking a license under the Commission's existing Experimental Radio Service rules.

There are concerns that granting the 5GAA Waiver Request will stall or halt vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) deployment in the United States. The potential safety benefits of this cooperative technology will undoubtedly diminish if the V2V and V2I market becomes fragmented into non-interoperable technologies. In addition, entities wishing to participate fully in a fragmented V2X ecosystem will be forced to invest in multiple technologies. Finally, duplicating identical services on different channels without additional benefit to consumers or society is spectrally inefficient.

At the same time, the 5GAA Waiver Request makes claims about the maturity, performance, evolution path, backwards compatibility, and cost of C-V2X. Before reallocating channels in the 5.9 GHz band away from DSRC to C-V2X, the Commission should fully evaluate and verify the validity of these claims.

II. THE 5GAA PROPOSAL IS NOT SUITABLE FOR A WAIVER REQUEST

In its Waiver Request, the 5GAA asks the Commission to allow for the deployment of C-V2X in the top two channels (Channel 182 and Channel 184) of the 5.9 GHz band. To accomplish this, the 5GAA asks the Commission to prohibit DSRC operations in these two channels.¹ This proposed reallocation represents a significant overhaul of the Commission’s existing licensing and channelization rules in the 5.9GHz band. As NCTA – The Internet & Television Association (NCTA) points out, the petition would “fundamentally and permanently rewrite the rules of the band.”² We agree with NCTA that the petition is “too broad in scope and duration to be resolved through a waiver proceeding.”³ We also agree with the Wi-Fi Alliance that “the Petition is procedurally flawed” because it “does not seek an *ad hoc* exception, but a change to the general standard,” and that “an entity that chooses to design a product in a non-compliant way is not entitled to waiver relief based on that incompatibility.”⁴

First, as the Commission is aware, there are DSRC deployments that are already underway under the existing 5.9 GHz licensing and channelization rules. DSRC-equipped vehicles were first deployed in the United States in 2017 with more light-duty and heavy-duty vehicles expected to follow. There are also already thousands of deployed or planned DSRC-enabled roadside units in dozens of states that support a variety of safety applications. Any changes to the existing rules governing the 5.9 GHz band will almost certainly have a significant impact on these existing and

¹ See *Petition for Waiver to Allow Deployment of Intelligent Transportation System Cellular Vehicle to Everything (C-V2X) Technology*, GN Docket 18-357, at Appendix D (filed Nov. 21, 2018). (“5GAA Petition”)

² Comments of NCTA – The Internet & Television Association at 4, GN Docket 18-357 (filed February 8, 2019) (“NCTA Comments”)

³ *Id.* at 2.

⁴ Comments Wi-Fi Alliance at III, GN Docket 18-357 (filed Feb. 8, 2019)

planned deployments. As Cisco Systems, Inc., (Cisco) notes, if the Waiver Request were granted, DSRC radios that are currently in use, on their way to the market, or in development that comply with the Commission's existing rules "would need to be changed, delayed, or abandoned."⁵

The 5GAA's claim that the Waiver Request "should have no significant impact on existing DSRC operations in the band"⁶ is simply incorrect and, as NCTA notes, "underplay[s] the negative effect of the proposed waiver."⁷ In fact, there are existing DSRC deployments that are using one or both channels that the 5GAA seeks to reallocate to C-V2X. As the American Association of State Highways and Transportation Officials (AASHTO) notes, "AASHTO members such as the Wyoming Department of Transportation (WYDOT), Utah Department of Transportation (UDOT), Michigan Department of Transportation (MDOT), Georgia Department of Transportation (GDOT), California Department of Transportation (Caltrans), Florida Department of Transportation (DOT), Nevada Department of Transportation (NDOT), Arizona Department of Transportation (ADOT), and Virginia Department of Transportation (VDOT), to name a few, have active deployments utilizing Channels 182 and/or 184."⁸ It is also our understanding that the New York City Department of Transportation Pilot and the Tampa-Hillsborough Expressway Authority Pilot, operating under the U.S. Department of Transportation Connected Vehicle Pilot Program, are deploying thousands of DSRC devices that use spectrum that would be impacted by this Waiver

⁵ Comments of Cisco Systems, Inc. at 11, GN Docket 18-357 (filed February 8, 2019). ("Cisco Comments")

⁶ 5GAA Petition at 21.

⁷ NCTA Comments at 7.

⁸ Comments of the American Association of State Highway and Transportation Officials at 2, GN Docket 18-357 (filed January 18, 2019). ("AASHTO Comments")

Request.⁹ Certainly, a decision to prohibit DSRC operation in these channels would have a direct impact on these existing deployments.

Second, by reducing the number of channels available to DSRC from seven to five, the 5GAA Waiver Request necessarily limits the expansion and growth of DSRC applications over time. NXP USA, Inc., (NXP) notes that the permanent loss of 20 MHz of spectrum would impact future DSRC deployments and explains that, “[w]ithout full access to each of the seven channels in the band, future DSRC deployment would be hobbled.”¹⁰ Under the existing industry consensus DSRC channel usage plan, communications that support a variety of important applications will occur on each the seven DSRC channels.¹¹ A reduction in available channels means that some of the valuable applications envisioned within this channel usage plan will no longer be delivered.

Finally, as several commenters – including Volvo Group North America, Volkswagen, AASHTO, and the American Trucking Associations – point out, there is real concern that C-V2X communications in the upper part of the band will cause harmful interference to DSRC transmissions in the lower part of the band.¹² We share the observation of Cisco that, while data is provided by the 5GAA to support to claim that C-V2X can withstand interference received from others, the Waiver Request fails to provide information on the “impact to DSRC of C-V2X

⁹ <https://www.its.dot.gov/pilots/index.htm>

¹⁰ See Comments of NXP USA, Inc. at 7, GN Docket 18-357 (filed January 29, 2019). (“NXP Comments”)

¹¹ *Dedicated Short Range Communication (DSRC) Systems Engineering Process Guidance for SAE J2945/X Documents and Common Design Concepts*, SAE J2945 201712 at 4.1.2.5 (Dec. 2017)

¹² See Comments of Volvo Group North America at 2, GN Docket 18-357 (filed Feb. 8, 2019) (“Volvo Comments”); Comments of Volkswagen Group of America, GN Docket 18-357 (filed Jan. 30, 2019); AASHTO Comments at 3-4; Comments of American Trucking Associations at 2 GN Docket 18-357 (filed Feb. 8, 2019) (“ATA Comments”).

operation up to the band edge of 5905 MHz.”¹³ In its comments, NXP shares research findings that indicate that C-V2X transmissions in an adjacent channel effectively reduces the sensitivity of DSRC systems, reducing their effective range. NXP explains, for example, that a C-V2X station transmitting on a directly adjacent channel at 30 meters distance can reduce DSRC range from more than 600 meters to around 200 meters.¹⁴ A reduction in performance of this magnitude almost certainly constitutes harmful interference and should not be permitted. As a result, before permitting C-V2X to operate in the band, the Commission must evaluate and fully understand whether, and the extent to which, C-V2X operations cause harmful cross-channel interference to DSRC.

As the Wireless Internet Service Providers Association notes, the 5GAA Waiver Request “ignores the rights of existing licensees to operate their registered facilities” under existing Commission rules.¹⁵ Unquestionably, the rights of existing licensees and the impacts the Waiver Request would have on those rights – as articulated above - must be fully understood by the Commission before it can responsibly take any action that allows C-V2X to operate in the band. For this reason, we share the view of several commenters that the significant changes proposed by the 5GAA are better considered as part of a formal rulemaking with a full public comment period, and not through a waiver. Alternatively, as suggested by Broadcom Inc. (Broadcom), the 5GAA should consider seeking a license through the Commission’s established Experimental Radio Service rules.¹⁶ As Cisco notes, “[g]iven the maturity of the C-V2X technology, and how little is

¹³ Cisco Comments at 16.

¹⁴ See NXP Comments at 6.

¹⁵ Comments of The Wireless Internet Service Providers Association at 5, GN Docket 18-357 (filed Feb. 8, 2019)

¹⁶ See Comments of Broadcom Inc. at 5, GN Docket 18-357 (filed Feb. 8, 2019) (“Broadcom Comments”)

presently known about its efficacy as a system to deliver safety and efficiency outcomes, an experimental license or licenses would have been a better choice than a waiver or rule change.”¹⁷

III. THE 5GAA PROPOSAL IS LIKELY TO HARM V2X DEPLOYMENT

Certainly, the Commission should be interested in promoting and encouraging continued innovation in the V2V and V2I space. We share that interest. However, as IEEE 802 notes in its comments, it is important to appreciate that “[e]volution in the ad hoc V2X domain is inherently more difficult than in traditional wireless domains like cellular, due to the unmanaged and direct communication between devices (with no base station to mediate across generations) and to the relatively long lifetimes of on-board and roadside units.”¹⁸ We agree with IEEE 802 that, “[i]f not implemented thoughtfully, evolution can increase costs (e.g. by requiring investment in multiple incompatible technologies), decrease benefits (e.g., by duplicating services in fragmented spectrum), and provide a disincentive to automakers and road authorities to deploy V2X.”¹⁹

a. INTEROPERABILITY SHOULD CONTINUE TO BE A PRIORITY

In establishing the requirement to conform to a single communication standard in its Report and Order, the Commission rightly prioritized interoperability.²⁰ The Commission recognized that interoperability was an essential element in realizing the societal and individual benefits of crash avoidance applications enabled by V2V and V2I. There is little doubt that the potential safety

¹⁷ Cisco Comments at 22.

¹⁸ Comments of IEEE 802 at 5, GN Docket 18-357 (filed Jan. 17, 2019)

¹⁹ *Id.* at 5.

²⁰ *See Amendment of the Commission’s Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band); Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services*, Report and Order, 19 FCC Rcd 2458, 2473 (Released February 10, 2004)

benefits of the technology – particularly with respect to crash avoidance – will diminish dramatically if the market becomes fragmented into multiple, non-interoperable technologies. As Autotalks explains in its comments, “[a]n accident can be prevented by V2X only if vehicles can understand each other” and “two vehicles with V2X will not be able to avoid a potential accident if two different non-interoperable technologies are used.”²¹ We share the concerns of the Maryland Department of Transportation that the “future can’t be realized if V2X technology isn’t interoperable”²² and agree with The Open Technology Institute at New America, American Library Association, Benton Foundation, Consumer Federation of America, Public Knowledge, and X-Lab that the 5GAA Waiver Request proposes to divide the band between “two competing technologies without so much as a suggestion about how the two will communicate well enough to ensure that in 15 years (the time it takes for the U.S. vehicle fleet to turn over) the nation will actually achieve interoperable and reliable real-time safety signaling.”²³

Along with other commenters, we urge the Commission to continue to prioritize interoperability in the band and reiterate its importance in realizing the full potential of V2V and V2I technology. We agree with NXP that “[a]llowing two separate technologies to operate in the dedicated ITS 5.9 GHz band that are unable to communicate frustrates the most fundamental purpose of the ITS: for vehicles to be able to communicate with each other with the goal of saving lives and preventing property damage by avoiding accidents.”²⁴ As a result, we share the view of the American Trucking Associations that the “rules should be structured to support device

²¹ Comments of Autotalks at 2, GN Docket 18-357 (filed Jan. 18, 2019) (“Autotalks Comments”)

²² Comments of the Maryland Department of Transportation at 2, GN Docket 18-357 (filed Jan. 18, 2019)

²³ Comments of The Open Technology Institute at New America, American Library Association, Benton Foundation, Consumer Federation of America, Public Knowledge, and X-Lab at 9, GN Docket 18-357 (filed Feb. 8, 2019)

²⁴ NXP Comments at 3.

interoperability, including backward compatibility, so that safety data can be exchanged among V2X-equipped vehicles.”²⁵ Similarly, we join Volvo Group North America in urging the Commission, when considering proposals to allow new V2X technologies to utilize the 5.9 GHz band, to “ensure compatibility with V2X systems developed under the existing FCC spectrum framework.”²⁶

b. ADDITIONAL AND UNNECESSARY PUBLIC AND PRIVATE COSTS SHOULD BE AVOIDED

The Commission should consider that, if a non-interoperable technology such as C-V2X were permitted to operate in the 5.9 GHz band alongside DSRC, any entity wishing to participate fully in the V2X ecosystem would be forced to invest in multiple technologies. As NXP notes, “[i]n a scenario where cars have to incorporate both DSRC and C-V2X to ensure interoperability, V2X systems will become nearly twice as expensive” because “both technologies will need to be present to make sure communication is possible with all surrounding cars.”²⁷

It is not surprising that this cost concern is top of mind for departments of transportation and public transit providers throughout the country, particularly those who have already invested extensive and scarce government resources into building out DSRC-enabled infrastructure consistent with the Commission’s existing licensing rules. As the Institute for Transportation Engineers (ITE) notes, “[g]iven the significant number of existing and planned DSRC-based infrastructure deployments, there are tax-payer funded implications to changing utilization parameters [A] decision to now give a portion to a non-compatible technology in the band would result in government agencies (federal, state, and local) having to spend more public-sector

²⁵ ATA Comments at 2.

²⁶ Volvo Comments at 5-6.

²⁷ NXP Comments at 13.

money to deploy new technology.”²⁸ In its comments, the Central Ohio Transit Authority urges the Commission to “protect the current investment in DSRC technology and not impose unintended, unnecessary or duplicative costs on operating entities.”²⁹ The Utah Department of Transportation further notes that it “has a fiduciary responsibility to the taxpayers of Utah” and expresses concern that its “publicly-funded investment in this life-saving technology could be rendered obsolete.”³⁰ Finally, AASHTO - which serves as a liaison between state departments of transportation and the federal government - notes that the “burden to state DOTs from a potential retrofit or replacement of existing DSRC-based equipment” is “likely to be significant.”³¹ The Commission should be concerned about the additional public and private cost that would be imposed on those already participating or wishing to participate in the V2X ecosystem by permitting C-V2X to operate in the band.

c. SPECTRAL EFFICIENCY SHOULD BE CONSIDERED

At a time when the Commission is appropriately focused on promoting spectral efficiency, it makes little sense to permit a competing, non-interoperable technology in the 5.9 GHz band. By doing so, the Commission would create a situation in which identical or nearly-identical V2V and V2I services would be duplicated on distinct channels without additional benefit to consumers or society. We agree with Autotalks that “[u]sing two-technologies for a single service is spectrum inefficient.”³²

²⁸ Comments of Institute for Transportation Engineers at 2, GN Docket 18-357 (filed Jan. 18, 2019) (“ITE Comments”)

²⁹ Comments of Central Ohio Transit Authority at 2, GN Docket 18-357 (filed Feb. 8, 2019)

³⁰ Comments of Utah Department of Transportation at 6, GN Docket 18-357 (filed Jan. 18, 2019)

³¹ AASHTO Comments at 3.

³² Autotalks Comments at 2.

At the same time, as noted above, a decision to promote spectral inefficiency by replicating services on separate channels will necessarily limit the ability of either technology to realize its full potential over time. DSRC technology would have fewer channels than is available under existing Commission rules and upon which the existing DSRC channel utilization plan was developed. This means that some DSRC applications that are currently under development will not be offered to make room for duplicative C-V2X services on other channels. Moreover, with access to only a couple of channels in the band, C-V2X would be similarly limited in the applications that it could support.

d. V2X DEPLOYMENT MAY BE DELAYED OR HALTED

We share the concerns of several commenters that the existence of competing, non-interoperable technologies in the 5.9 GHz band will likely delay or even halt V2X deployment in the United States. Broadcom notes that a decision by the Commission to grant the 5GAA Waiver Request would “create uncertainty for key stakeholders” and potentially stall the development of DSRC technologies in the 5.9 GHz band.³³ ITE expresses fear that “any changes in the short term would have the effect of hitting the ‘reset’ button and erasing all the valuable lessons learned – and significantly setting-back nationwide deployment of life-saving technology.”³⁴ And NXP notes that “a split market” will “detract from the business case for V2X communications and actually inhibit nationwide ITS deployment.”³⁵ If the Commission remains committed to the potentially life-saving benefits of V2X technology, it should be reluctant to take any action that would needlessly delay or unnecessarily hinder its deployment.

³³ Broadcom Comments at 4-5.

³⁴ ITE Comments at 3.

³⁵ NXP Comments at 3.

IV. THE 5GAA WAIVER REQUEST INCLUDES A NUMBER OF STATEMENTS THAT SHOULD BE INDEPENDENTLY EVALUATED AND VERIFIED

a. TECHNOLOGY MATURITY

In its Waiver Request, the 5GAA asks the Commission to allow C-V2X access to the 5.9 GHz band for “immediate deployment.”³⁶ While we appreciate the extensive work that is being done to develop C-V2X, the reality is that the technology is still very much under development and is, at best, years away from being ready for deployment in a meaningful way in production vehicles. Moreover, before C-V2X could responsibly be used for crash-imminent safety purposes, it would have to be validated with the same rigor and at the same scale as DSRC has already been validated. As NXP notes, “C-V2X technology is still in its initial stage of development and has not been proved in any significant field test.”³⁷ Aptiv notes that “5GAA has yet to test, or road validate[,] a large swath of critical conditions to confirm road safety claims, capabilities, interoperability, driving readiness, and deployment.”³⁸ The Commission should be reluctant at this stage to reallocate spectrum away from DSRC - which is a proven, reliable, and mature technology - to a technology that is still in its infancy.

b. PERFORMANCE

In its Waiver Request, the 5GAA claims that C-V2X “consistently outperformed” DSRC in a number of key areas.³⁹ As the 5GAA notes, these claims are based on testing “conducted by members of 5GAA.”⁴⁰ As the Commission is aware, questions have been raised about the

³⁶ 5GAA Petition at 2

³⁷ NXP Comments at 7.

³⁸ Comments of Aptiv at 1, GN Docket 18-357 (filed Jan. 11, 2019)

³⁹ 5GAA Petition at p. 3

⁴⁰ *Id.*

reliability and interpretability of 5GAA's testing results.⁴¹ Moreover, as NXP and u-blox note, additional analyses are available which suggest that DSRC actually has a performance advantage over C-V2X.⁴² For this reason, we agree with AASHTO that the performance of C-V2X should be determined through "testing and evaluation of the technology by independent sources (rather than accepting a 5GAA report on performance)."⁴³

c. EVOLUTION PATH

We share general excitement about 5G and agree with the proponents of the Waiver Request that 5G has the potential to "spur the development of a myriad of innovative applications that will revolutionize a broad range of industries, transforming the way we work, learn, and get around."⁴⁴ We also share the view that the "transportation industry – and specifically the automotive industry" is "one of the key sectors that will benefit from 5G capabilities and services."⁴⁵ We fully expect that cellular technologies, such as 4G and 5G, will continue to play an important role in providing in-vehicle and vehicle-related services to consumers in the future, regardless of whether cellular V2X technology is also used for short-range V2V and V2I communication.

In their Waiver Request, the 5GAA claims that "C-V2X offers an evolution path to 5G."⁴⁶ In reality, the C-V2X technology that is being touted and promoted in the 5GAA Waiver Request

⁴¹ See Letter from Toyota Motor North America to Marlene H. Dortch, Secretary, Federal Communications Commission, ET Docket 13-49 (filed July 23, 2018); See Cisco Comments at 14-16.

⁴² See NXP Comments at Appendix A; See Comments of u-blox America Inc. at Appendix D, GN Docket 18-357 (filed Jan. 17, 2019).

⁴³ AASHTO Comments at 2.

⁴⁴ See 5GAA Petition at p. 16.

⁴⁵ *Id.*

⁴⁶ *Id.* at 3.

is LTE-V2X and based on 4G technology. As NXP notes, “[i]t is not 5G and is not part of a roadmap to 5G using new radio technology.”⁴⁷

While we understand that the 5GAA is currently working on 5G New Radio (NR) V2X technology, we also understand that the standards for that technology are not yet finalized and the development of the technology is at best several years behind the development of LTE V2X. Moreover, and importantly, 5G NR V2X will not be backwards compatible with 4G LTE V2X.⁴⁸ Therefore, while there may be an evolution path to 5G with the not-yet-developed 5G NR V2X, there is not an evolution path to 5G or 5G V2X from the LTE V2X that the 5GAA intends to first deploy and that is the subject of the 5GAA’s current Waiver Request.

d. BACKWARDS COMPATIBILITY

In its Waiver Request, the 5GAA notes that “new vehicles will be able to communicate with older versions of C-V2X-enabled vehicles, infrastructure, and networks.”⁴⁹ Certainly, backwards compatibility should be a key element of a successful V2V and V2I network. The Commission should promote and advance a V2V and V2I ecosystem that enables production vehicles in the future to communicate with production vehicles in the market today. Unfortunately, despite the 5GAA’s claims to the contrary, C-V2X has significant backwards compatibility limitations. As noted above, Release 16 (5G NR V2X) will not be backwards compatible with either LTE V2X Release 14 or LTE V2X Release 15. This means that, to provide backwards compatibility, a vehicle with 5G NR V2X Release 16 technology will also have to include both

⁴⁷ NXP Comments at 11.

⁴⁸ It is our understanding that 5G NR V2X will not be designed to coexist with LTE V2X in the same channel and will therefore require a separate spectral allocation from LTE V2X. This means that vehicles that choose to support C-V2X in the future will need to deploy concurrent 4G LTE V2X and 5G NR V2X radios.

⁴⁹ 5GAA Petition at 17.

LTE V2X Release 15 and LTE V2X Release 14 technology. The Commission should be cautious about embracing a technology that would require outfitting a vehicle or infrastructure with multiple versions of a technology in separate spectral bands to enable or facilitate communication.

It is important to note that, as a few commenters point out, work is underway in IEEE to produce a Next Generation V2X (NGV) standard that will provide for true backwards compatibility with DSRC.⁵⁰ As Volvo Group North America notes, the IEEE NGV standard will “provide a seamless evolution path for DSRC that guarantees device interoperability, same-channel coexistence, and backward compatibility.”⁵¹ We agree with Volvo Group North America that this will likely “stimulate further near-term investment in DSRC by ensuring that those investments will be protected and enhanced in the years to come.”⁵²

e. COST SAVINGS

In the Waiver Request, the 5GAA also claims that C-V2X “offers a unique cost efficiency.”⁵³ Specifically, in noting that virtually all vehicles are or soon will be equipped with modern cellular chipsets, the 5GAA claims that C-V2X can be added as an additional feature in such chipsets.⁵⁴ The 5GAA also claims that C-V2X will be able to “leverage today’s cellular networks and tomorrow’s 5G networks to reduce infrastructure development costs.”⁵⁵ Clearly, the cost effectiveness of a technology is a key consideration. However, it is not clear that C-V2X is

⁵⁰ See ITE Comments at 2; IEEE Comments at 3-5; Comments of u-blox America Inc. at 4 GN Docket 18-357 (filed January 17, 2019).

⁵¹ Volvo Comments at p. 6.

⁵² *Id.* at 6.

⁵³ 5GAA Petition at 18.

⁵⁴ *Id.* at 19.

⁵⁵ *Id.*

more cost effective than DSRC. In fact, there is some evidence that DSRC may be more cost effective than C-V2X.⁵⁶

First, regardless of whether a vehicle has a cellular chipset, the incorporation of C-V2X into that chipset will require a separate radio to support C-V2X communication in the 5.9 GHz band. In other words, the same radio that supports cellular communication using cellular spectrum cannot simultaneously support C-V2X communication in the 5.9 GHz band. This is similar to DSRC, where one radio will be required to support DSRC communication in the 5.9 GHz band and another radio will be required to support traditional cellular communication. As a result, there does not appear to be a comparative efficiency for C-V2X with respect to the number of required radios. With respect to the possibility that there may be cost efficiencies to simply adding C-V2X to an LTE chipset, NXP notes that adding DSRC to a Wi-Fi chipset costs about the same.⁵⁷ In other words, it is possible for automakers deploying DSRC to similarly leverage another chipset that virtually all vehicles have or will soon have.

It is also not clear that C-V2X has any unique ability over DSRC to utilize existing infrastructure. C-V2X uses short-range communication in the 5.9 GHz band, which is distinct from cellular communication using traditional cellular spectrum. This means that additional radio would need to be incorporated into any mobile or other infrastructure to support C-V2X. As NXP points out, “[i]t would be equally easy to incorporate DSRC functionality in the mobile infrastructure.”⁵⁸

⁵⁶ See NXP Comments at 12.

⁵⁷ See *Id.*

⁵⁸ NXP Comments at 14.

V. CONCLUSION

Due to the significant impact that a reallocation of channels within the 5.9 GHz band will have on DSRC, the requests being made in the 5GAA Waiver Request should only be considered as part of a formal rulemaking and not through this Waiver Request. Moreover, the Commission should be aware that a decision to permit C-V2X in the 5.9 GHz band will likely create a fragmented, non-interoperable V2V and V2I market. This fragmentation is likely to reduce safety benefits, increase public and private costs, foster spectral inefficiency, and potentially stall or halt V2V and V2I deployment in the United States. Finally, the 5GAA Waiver Request includes several statements about C-V2X that should be independently evaluated and validated before any action is taken to allow C-V2X to operate in the 5.9 GHz band.